Risk and protective factors for mental health at a youth mass gathering

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Abstract

Background: Mass gatherings are well-documented for their public health risks, however, little research has examined their impact on mental health or focused on young people specifically. This study explores risk and protective factors for mental health at mass gatherings, with a particular focus on characterizing attendees with high levels of psychological distress and risk taking.

Method: Data collection was conducted *in situ* at "Schoolies", an annual informal week-long mass gathering of approximately 30,000 Australian school leavers. Participants were 812 attendees of Schoolies on the Gold Coast in 2015 or 2016 (74% aged 17 years old).

Results: In both years, attendee mental health was found to be significantly better than population norms for their age-peers. Identification with the mass gathering predicted better mental health, and this relationship became stronger across the course of the mass gathering. Attendees with high levels of psychological distress were more likely to be male, socially isolated, impulsive, and in a friendship group where risk taking was normative.

Conclusions: Mass gatherings may have a net benefit for attendee mental health, especially for those attendees who are subjectively committed to the event. However, a vulnerable subgroup of attendees requires targeted mental health support.

Keywords: social identity; well-being; mass gathering medicine; special events; health risk behaviour

Risk and protective factors for mental health at a youth mass gathering

Mass gatherings are a public health concern for a number of reasons. Such events entail a number of risks to health, including from lack of sanitary or safe conditions, spread of contagious disease, and even the risk of terror attack [1-3]. However, only a small body of extant research has focused on mass gatherings of young people. These bring with them specific health concerns, including widespread risk taking behaviour including drug and alcohol use [4-6].

In studying mass gatherings, research has focused on profiling the nature of the health risks and planning for emergency service access and response [7-9]. Other work in this area has explored different models of crowd management [10-12], early identification of people who are at risk [13,6], and the value of harm reduction strategies, such as 'sanctuary spaces' and outreach medical support [14,15]. However, the physical health risks of mass gatherings represent only one side of the health story. In particular, such a focus fails to elucidate *why* people engage in such events, or the effect of mass gatherings on mental health.

By contrast, alongside this literature on the public health risks of mass gatherings, a recent body of research has emerged showing that there can be some unexpected *benefits* of mass gatherings for health, particularly psychological health [16]. This research is grounded in a theoretical framework called the social identity approach, which encompasses social identity theory [17] and self-categorisation theory [18]. *Social identity* refers to the subjective sense of affiliation and self-definition people experience in social groups. Social identification is the psychological representation of one's social reality, and thus has enormous implications for understanding and predicting cognition, affect and behaviour. Although the social identity approach was developed and originally tested in the context of prejudice, stereotyping, and collective action, recently there has been a significant uptake of these ideas among health researchers [19,20], including in the context of mass gatherings.

Recent studies have shown that getting involved in a mass gathering can represent the *enactment* of a valued identity – an opportunity to publicly express the values, beliefs, and norms of that group. For example, being part of a religious pilgrimage can be a positive, meaningful, and even transformational experience – but only if one is a committed adherent of the religion in question. Indeed, empirical support for the psychological benefits of mass gatherings have been predominantly explored at religious events. For example, one study of 416 pilgrims attending the Magh Mela in India reported improved subjective health over time, but only to the degree they felt strongly identified with fellow pilgrims [21]. In a related line of research, a study of 1,194 pilgrims attending Mecca in Saudi Arabia found that people

felt safer and perceived the crowds to be less dangerous when they felt strongly identified with others in the crowd [22]. Even when a mass gathering results from a disaster or other emergency situation, studies have found that people are more resilient and cooperative when they perceive a sense of shared identity with others in the crowd [23-26]. In highlighting social identification as a protective factor for mental health, these findings are also consistent with a growing body of work outside of the mass gatherings context [27,28,20].

The research on the psychology of mass gatherings represents an important first step in understanding why people engage in mass gatherings, and how engagement can have psychological benefits even while simultaneously posing a number of health risks. However, two important issues remain unexplored. The first is that this evidence has focused on *wellbeing*, and has not investigated mental health or clinically-significant psychological distress specifically. Shifting focus to high-risk individuals is of particular use to public health planning, as it is these people who are most likely to require a response from emergency services at a mass gathering. Second, research on the psychology of mass gatherings has been conducted almost entirely with adults. We argue that adolescents and emerging adults warrant focused investigation, both because prior studies have suggested that young people may be more vulnerable at mass gatherings in general [4], and because young people experience some of the highest levels of psychological distress and health risk taking [29,30]. The management of mass gatherings of young people, therefore, needs to address not only the "usual suspects" of contagious disease, crowding, and heat exhaustion, but also an increased risk of mental health crises (especially, suicide) as well as risk taking behaviour.

The Current Research: A Youth Mass Gathering in Context

This project was conducted at annual "Schoolies" celebrations in November 2015 and 2016 on the Gold Coast, Australia. Schoolies is a mass gathering of Australian school leavers, mostly aged 17 and 18, for approximately one week to celebrate the end of secondary schooling. Schoolies is seen as a "rite of passage" in which young people celebrate their emerging adulthood identity [31]. Schoolies has been estimated to involve over a third of school leavers in Australia, gathering at a variety of beachside locations both domestically and overseas [32]. Approximately 30,000 young people congregate each year at the largest Schoolies site, Surfers Paradise on the Gold Coast.

The behaviour of the young people attending Schoolies is closely scrutinised by their families, media, government, law enforcement, and local residents. The mass gathering of school leavers, with its characteristic partying and underage alcohol consumption, is portrayed as a risk to local residents' property and security, public order, and the safety of

attendees [33,34]. Attendee safety and risk taking behaviour became most salient following several high-profile deaths of young people who fell from apartment balconies, or died from drug overdose [35,32]. For these reasons, prior research on Schoolies has predominantly focused on the health risk behaviours of drinking, drug use, and casual sex, with the evidence suggesting that these behaviours (particularly alcohol intoxication) are common and rates stable over the past three decades [36-41]. What has not been explored to date, at Schoolies or in any youth mass gathering, are the effects of such events on mental health, as well as risk and protective factors for mental health in the mass gathering context.

The goals of this project were therefore twofold. The first goal was to explore the impact of attending a youth mass gathering on mental health. Consistent with research conducted at mass gatherings of adults, we hypothesized (H1) that mental health among attendees would be better, on average, than their age peers. In line with the literature on the psychology of mass gatherings, we further hypothesise (H2) that participating in a mass gathering supports mental health when the event is seen as an *expression of one's identity*. Schoolies is an event marking the end of high school, and so participation might be seen as celebrating this transition and an emerging adult identity. Specifically, we predict a positive association between young people's social identification with fellow attendees and their mental health (H2a); we predict a 'dosage' effect, where time spent at a mass gathering is positively associated with mental health (H2b); and that this dosage effect would be more pronounced in those with stronger identification with fellow attendees (H2c).

The second goal of this project was to characterize attendees at a youth mass gathering who were likely to be experiencing serious mental illness. As there is no existing literature exploring who is vulnerable to poor mental health at mass gatherings, this goal was necessarily exploratory, and based on the extant evidence regarding at-risk youth in general. Thus, our tentative third hypothesis (H3) was that attendees with elevated psychological distress would exhibit a cluster of risk factors related to their demographic characteristics (gender, age, socioeconomic status, geographic remoteness), social relationships (identification with their own friendship group; attitudes towards other groups), and propensity for risk taking (e.g., friendship group norms for risk behaviours; impulsivity).

These hypotheses were investigated by sampling attendees at Schoolies events on the Gold Coast in 2015 (Study 1) and in 2016 (Study 2).

Study 1

Study 1 Method

Participants and design

We surveyed 217 young people attending Schoolies on the Gold Coast during November 2015. Respondents were recruited at the beginning of Schoolies celebrations (Day 1); field teams approached respondents after they had collected wristbands verifying them as a legitimate Schoolies attendee (i.e. a recent school leaver). All participants were invited to take part in follow-up surveys (identical in content to the main survey) on Days 3, 5, and 7, with those who consented providing their mobile number so that they could be contacted with a link to the follow-up survey. In both studies, all available data were analysed and thus the N for each analysis varies slightly, and is reported for each statistical test below.

The survey took approximately 10 minutes to complete. Participation was voluntary and required fully informed consent. This research was approved by the university ethics committee, protocol number #2015001534. Participants received a voucher for a local sandwich venue worth $5 in return for their involvement at the initial survey, as well as an additional $5 voucher for each follow-up survey they participated in.

Measures

Mental Health. Mental health was operationalised as psychological distress as measured by the K6, a validated and reliable screener [42]. Participants responded to six items such as "During the past two days, about how often did you feel worthless?" on a five-point scale from "None of the time" (1) to "All of the time" (5), $\alpha = .85$. This measure was selected because it has been administered to a large population of Australian youth by the Australian Bureau of Statistics and by Mission Australia, and thus recent, high-quality normative data are available (we used the Australian approach to scoring to align with this normative data. This yielded a summed total scale ranging from 6-30)[43]. Furthermore, the K6 and its longer-version the K10 are routinely used in primary care in Australia to assess the need for referral to a mental health professional, with a cut-off of 18 considered indicative of *probable serious mental illness*.

Identification with the mass gathering. Identification with fellow attendees at the mass gathering was measured using the Single Item Social Identification scale [44] as follows: "I identify with other Schoolies", with response options from 1 (Not at all) to 7 (Very much so).

Identification with friendship group. Participants also completed the Single Item Social Identification Scale [44] to measure identification with their friendship group ("I identify with my friend group") on a scale from 1 (Not at all) to 7 (Very much so).

Attitudes towards other groups at Schoolies. Participants were asked their perceptions of three different groups of people at Schoolies: other schoolies, the police, and volunteers. For each group, participants responded to seven items "I see the presence of the [other schoolies] as:…" corresponding to three attitudes: hostile (frightening, threatening, hostile), safe (legitimate, safe), and fun (exciting, enjoyable). Each item was assessed on a seven-point scale from 1 (Strongly disagree) to 7 (Strongly agree), all $\alpha > .59$.

Norms for risk taking in the friendship group. Participants were asked to consider six different risk taking behaviours in terms of how common and acceptable they were in their friendship group (also known as descriptive and injunctive norms, respectively). The specific items were informed by norm focus theory [45,46] and adapted from Bodimeade and colleagues [47]. The items concerned behaviours known to be relevant to Schoolies contexts: drinking, drinking to get drunk, having sex with multiple partners, taking drugs, causing trouble, and taking risks. Responses were measured using a seven-point scale from 1 (strongly disagree) to 7 (strongly agree). Items were averaged to create two subscales representing each participants' perceptions of how common ($\alpha = .78$; e.g., "Most of my friends will be drinking to get drunk") and acceptable ($\alpha = .83$; "Most of my friends think I should drink to get drunk") risk taking is in their friendship group.

Trait impulsivity. Personality pre-disposition towards impulsivity is a well-established risk factor for substance abuse and risk taking [48]. We included the four-item impulsivity subscale from the Substance Use Risk Profile Scales ($\alpha = .78$)[49]. For example, "I usually act without stopping to think", measured on four-point scale from 1 (strongly disagree) to 4 (strongly agree).

Demographics. At the end of the survey, participants were asked to indicate their age, gender, and postcode. Postcode was used to calculate *socioeconomic status* as a decile based on Socio-Economic Indices For Areas (SEIFA) data [50]. Postcode was also used to calculate *geographic remoteness* of a participants' usual residence, based on the Australian Statistical Geography Standard data from 2011 [51].

Study 1 Results

Participants were 217 Schoolies attendees who provided valid data on at least a subset of the variables of interest (including the K6). Participants were 51.2% female and 95% were aged 17 or 18, with a wide range of socioeconomic backgrounds. Table 1 presents full

demographic information. Participation in the longitudinal component of the survey was low (less than 14% of Day 1 participants provided usable follow-up data). Therefore, we collapsed across follow-up time points to yield a Wave 2 follow-up sample of 30 people (participants who had follow up data at any time point were included in this sample; for those few participants who responded to multiple follow-up time points, we used their Day 5 responses as this was the time point with the most data available).

H1: Psychological distress among attendees

Psychological distress among attendees was relatively low overall (M = 12.87; SD = 5.33). On Day 1, approximately 17% of the sample exhibited elevated psychological distress (a score above 18 on the K6). We compared this with a nationally representative sample of 21,172 young Australians aged 15 to 19 collected by Mission Australia in 2016 [52]. In this nationally representative sample, 22.8% of respondents fell above the cut-off score of 18 on the K6, indicative of probable serious mental illness. Consistent with H1, psychological distress in our sample of Schoolies was somewhat lower than their age-peers, $\chi^2(1) = 3.97$, p = .046.

H2: Social identification with a mass gathering is associated with reduced psychological distress

Consistent with H2a, a regression analysis found that the more strongly an attendee identified with other Schoolies attendees at Wave 1, the lower their psychological distress, $F(1,215)=3.91$, p = .049. Furthermore, and consistent with H2b, psychological distress was significantly lower at Wave 2 (M = 11.20, SD = 4.15) compared to Wave 1 (M = 13.50; SD = 5.64; $t(29) = 2.50$, p = .018. A hierarchical regression analysis was used to assess whether change in psychological distress over time was related to Schoolies identification. Consistent with H2c, controlling for Wave 1 psychological distress (at Step 1), Schoolies identification at Wave 1 (Step 2) predicted psychological distress at follow up, $F(1,27) = 5.91$, p = .022 (see Figure 1).

H3: Characterising vulnerable attendees

To investigate the characteristics of attendees experiencing mental ill-health, participants whose K6 score was above the recommended cut-off of 18 [43] were compared to the rest of the sample using t-tests (for continuous variables) and chi-square tests (for categorical variables). Participants were compared in three domains: (1) demographic characteristics, (2) social relationships, and (3) risk taking propensity.

Demographic characteristics. Males were more likely to have elevated psychological distress than females, comprising 66% of the at-risk group, $\chi^2(1) = 5.64$, p = .018. There was

no effect of age, $t(213) = -.87$, $p = .387$, or socioeconomic status, $t(213) = .54$, $p = .590$. Geographic remoteness was marginally associated with elevated psychological distress, $\chi^2(3) = 6.88$, $p = .076$, such that attendees from regional areas were somewhat more likely to be distressed than attendees from urban areas.

Social relationships. Attendees with elevated psychological distress were marginally less likely to identify with their friendship group $t(215) = 1.93$, $p = .055$ ($M_{\text{high K6}} = 5.84$; $M_{\text{low K6}} = 6.24$; Cohen's $d = .31$). People with elevated psychological distress perceived all other groups at Schoolies to be more hostile than did non-distressed participants; namely, other Schoolies attendees, $t(201) = -6.05$, $p < .001$ ($M_{\text{high K6}} = 4.57$; $M_{\text{low K6}} = 3.16$; $d = 1.02$), the police, $t(209) = -5.00$, $p < .001$ ($M_{\text{high K6}} = 4.38$; $M_{\text{low K6}} = 3.07$; $d = 0.85$), and volunteers, $t(210) = -4.89$, $p < .001$ ($M_{\text{high K6}} = 3.49$; $M_{\text{low K6}} = 2.25$; $d = 0.80$). Other Schoolies attendees were seen as less fun, $t(210) = 2.03$, $p = .044$ ($M_{\text{high K6}} = 5.42$; $M_{\text{low K6}} = 5.87$; $d = 0.36$), while police, unexpectedly, were seen as more fun, $t(209) = -2.32$, $p = .021$ ($M_{\text{high K6}} = 4.81$; $M_{\text{low K6}} = 4.16$; $d = 0.42$). However, police were also perceived to be less safe, $t(210) = 2.46$, $p = .015$ ($M_{\text{high K6}} = 4.96$; $M_{\text{low K6}} = 5.59$; $d = 0.43$).

Risk taking propensity. Attendees experiencing elevated psychological distress were more likely to perceive risk taking in their friendship group as both common, $t(210) = 2.03$, $p = .047$ ($M_{\text{high K6}} = 4.51$; $M_{\text{low K6}} = 4.09$; $d = 0.36$), and acceptable, $t(208) = 2.84$, $p = .005$ ($M_{\text{high K6}} = 4.37$; $M_{\text{low K6}} = 3.58$; $d = 0.57$). Unexpectedly, impulsivity was not significantly associated with elevated psychological distress, $t(211) = -1.22$, $p = .224$.

Study 1 Discussion

As hypothesised, Study 1 found that attendees at a youth mass gathering were in somewhat better mental health than their age peers, and that this effect became more pronounced over time, particularly for those attendees who strongly identified with the mass gathering. Study 1 also provides the first evidence for a profile of attendees experiencing psychological distress. These attendees were more likely to be male, hold negative attitudes towards other groups at Schoolies (particularly, to perceive other groups as hostile), and to believe that risk taking behaviours were both common and acceptable among their friendship group. Although some aspects of this profile reflect existing evidence for risk factors for youth mental health, it is worth highlighting some differences. In particular, there is solid evidence that, in general, female adolescents experience a higher burden of mental ill-health than male adolescents (e.g., Gore et al., 2011), whereas the opposite trend was apparent from these data collected at a youth mass gathering. Although we did not hypothesise this gender difference, it is consistent with anecdotal evidence from health and emergency service

personnel from the mass gathering, who note that the friendship support networks of female attendees tend to be stronger (which could be protective).

The main limitation of Study 1 was the very small number of people who participated in the longitudinal component of the survey, which tempers our confidence in the tests of Hypothesis 2 in particular. This low retention is perhaps unsurprising, given the Schoolies context (attendees are typically spending their waking hours with their friends, engaging in concerts and festival activities, and high levels of alcohol consumption have been documented in previous research). However, it is difficult to rule out the possibility that changes over time are attributable to differential attrition. In Study 2, conducted at Schoolies 2016, we addressed this by collecting independent field samples of attendees on Day 1 and Day 4 of the mass gathering, which allowed for a between-subjects comparison across time.

Study 2

Study 2 hypotheses mirrored those of Study 1 and aimed to replicate its findings. Study 2 was conducted with a new cohort of attendees at the same mass gathering one year later. Study 2 included some additional measures relevant to Hypothesis 3 (e.g., ethnicity, felt belonging with and trust in friends, risk perception) and aimed to recruit a substantially larger sample, particularly at the follow-up time period.

Study 2 Method

Participants and design

Study 2 replicated the method of Study 1, with one exception. Specifically, due to the poor retention for the longitudinal component of the study in Study 1, in 2016 we surveyed attendees *in situ* at two occasions. Wave 1 (N = 333) was conducted on the first day of Schoolies celebrations (as in 2015); field teams approached respondents after they collected wristbands verifying them as registered attendees of Schoolies. Wave 2 (N = 263) was conducted on Day 4 of Schoolies celebrations. Field Team A approached respondents in public malls, while Field Team B approached respondents gathered in hotel common areas, for instance, during a free charity pancake event. Importantly, participants were sampled independently at the two time points. Analyses were conducted for the full sample (both time points included), with time point treated as a between-subjects variable where appropriate (specifically, to test H2).

This research was approved by the university ethics committee, protocol number #16-PSYCH-MCP-32-AH. As in Study 1, participants received a voucher for a local sandwich venue worth $5.

Measures

Measures were identical to the 2015 survey with a few additions. There were no changes made to the measures of Mental health, Attitudes to other groups at Schoolies, Identification with the mass gathering, Identification with friendship group, Norms for risk taking in the friendship group or Trait Impulsivity. Demographics questions were the same with an additional question about ethnicity (options were European-White, African, Aboriginal or Torres Strait Islander, Pacific Islander, Asian, Middle Eastern, or Other/Mixed (please specify). The following additional measures were also included:

Connection to friends. Two additional items were added to assess broader social connectedness with the friendship group. These were a single item measure of belonging ("I feel like I belong in my friendship group")[53] and a single item measure of trust ("I can trust my group of friends at Schoolies")[54]. All three items were measures on a seven-point scale from 1 (Not at all) to 7 (Very much so).

Size of social network at Schoolies. We also asked participants how many people they knew personally who were attending Schoolies this year. Responses above 300 were top-coded at 300, on the basis that this number was plausible for local attendees who knew people from across several schools, all of whom had large cohorts in attendance. Despite this top-coding, the mean was very high at 85 (SD = 93.03), with a modal response of 100. Therefore attendees typically felt that they knew many other people at the mass gathering.

Risk perception for behaviours likely to cause injury or death. Participants were asked to rate how risky they thought it would be to engage in six different behaviours while at Schoolies on a scale from (1) not at all risky to (7) extremely risky. These included having unprotected sex, drinking until passing out, taking a drink from a stranger, getting in a fight, jumping between balconies, and throwing possessions between balconies. These six behaviours ($\alpha = .85$) were chosen because they are associated with significant risk of injury or death, have been the subject of significant media attention at Schoolies, and are the target of current education campaigns to prevent risk taking among Schoolies attendees.

Study 2 Results

The Study 2 sample closely resembled the Study 1 sample. Participants were predominantly aged 17 or 18, evenly split between males and females, mostly white, and varied substantially in their socioeconomic status. More details of the sample are provided in Table 1. No statistically significant differences were found between the samples recruited at Wave 1 and Wave 2 on any demographic variables (age, gender, socioeconomic status, or geographic remoteness).

H1: Psychological distress amongst attendees

Psychological distress was relatively low overall (M = 12.23; SD = 5.37). Approximately 14% of the sample exhibited elevated psychological distress (a score above 18 on the K6). Consistent with H1 and with Study 1, psychological distress in our sample of Schoolies attendees was significantly lower than their age-peers, $\chi^2(1) = 26.84$, $p < .001$.

H2: Social identification with a mass gathering reduces psychological distress

To assess H2, a moderation analysis was conducted using Hayes PROCESS Model 1 [55]. Standardised measures of study wave (predictor), identification with the mass gathering (moderator) and psychological distress (outcome) were included in the model. Providing only weak support for H2a, identification with the mass gathering was marginally negatively associated with psychological distress as a main effect ($\beta = -.21$, $p = .093$). Consistent with H2b, we found a significant and negative main effect of study wave on psychological distress ($\beta = -.22$, $p = .007$), such that psychological distress was significantly lower among the Wave 2 sample (M = 11.58; SD = 5.09) than among the Wave 1 sample (M = 12.74, SD = 5.52). In support of H2c, we found a significant Wave x Identification interaction ($\beta = -.18$, $p = .029$), see Figure 2. Among people one standard deviation below the mean in identification with the mass gathering, there was no relationship between study wave and psychological distress ($\beta = -.04$, $p = .728$). However, the relationship between study wave and psychological distress was significant for attendees at the mean of social identification ($\beta = -.22$, $p = .007$), and stronger still at one standard deviation above the mean of social identification ($\beta = -.40$, $p < .001$).

H3: Characterising vulnerable attendees

As in Study 1, participants whose K6 score was above the recommended cut-off of 18 were compared to the rest of the sample in three domains: (1) demographic characteristics, (2) social characteristics, and (3) risk taking propensity. The profile of high risk attendees is summarised in Figure 3.

Demographic characteristics. First, and replicating Study 1, analyses revealed that age, $t(576) = -.70$, $p = .482$) and socioeconomic status, $t(552)=.62$, $p = .537$ were not related to levels of psychological distress. Geographic remoteness, $\chi^2(4) = 3.67$, $p = .452$ was also unrelated to psychological distress. However, and also consistent with Study 1, people with elevated psychological distress were more likely to be male, $\chi^2(2) = 7.60$, $p = .022$. Over 17% of male attendees had elevated psychological distress, compared to 9.3% of female attendees.

In terms of ethnicity, over three-quarters of attendees were White/European and so there was insufficient data to analyse any other ethnic group separately. Therefore, a

dichotomous variable was created to indicate whether participants were part of the dominant ethnic and cultural group (i.e., White/European) or not. It was found that non-white participants were more likely to be experiencing elevated psychological distress, $\chi^2(2) = 16.71$, $p < .001$. Almost a quarter (24.4%) of non-white attendees had elevated psychological distress, compared to 10.7% of white attendees.

Social relationships. Second, we considered the social connectedness of attendees with elevated psychological distress. The size of participants' social network at Schoolies was unrelated to psychological distress, $t(508) = 1.26$, $p = .208$. However, social networks of attendees with elevated psychological distress tended to be poorer quality. Specifically, distressed respondents were less likely to identify with their friends, $t(584) = 3.43$, $p < .001$ ($M_{\text{high K6}} = 5.61$; $M_{\text{low K6}} = 6.14$; $d = 0.37$), to feel a sense of belonging with their friends, $t(583) = 4.42$, $p < .001$ ($M_{\text{high K6}} = 5.58$; $M_{\text{low K6}} = 6.19$; $d = 0.44$), or to trust their friends, $t(583) = 4.09$, $p < .001$ ($M_{\text{high K6}} = 5.61$; $M_{\text{low K6}} = 6.27$; $d = 0.49$).

Consistent with Study 1, distressed respondents were more likely to have less favourable attitudes towards all other groups at the mass gathering. They appraised police as less safe, $t(589) = 3.52$, $p < .001$ ($M_{\text{high K6}} = 5.32$; $M_{\text{low K6}} = 5.90$; $d = 0.40$), and more hostile, $t(579) = -5.57$, $p < .001$ ($M_{\text{high K6}} = 3.83$; $M_{\text{low K6}} = 2.86$; $d = 0.67$). Similarly, they perceived volunteers as less safe, $t(589) = 2.77$, $p = .006$ ($M_{\text{high K6}} = 5.43$; $M_{\text{low K6}} = 5.87$; $d = 0.32$), and more hostile, $t(577) = -5.91$, $p < .001$ ($M_{\text{high K6}} = 3.04$; $M_{\text{low K6}} = 2.08$; $d = 0.64$). Finally, they perceived other schoolies to be less fun, $t(588) = 4.25$, $p < .001$ ($M_{\text{high K6}} = 4.98$; $M_{\text{low K6}} = 5.56$; $d = 0.47$), and more hostile, $t(582) = -5.82$, $p < .001$ ($M_{\text{high K6}} = 3.82$; $M_{\text{low K6}} = 3.00$; $d = 0.64$), compared to respondents without elevated levels of distress.

Risk taking propensity. Propensity for risk taking was examined in respondents with elevated psychological distress versus the rest of the sample. As in Study 1, distressed respondents reported that risk taking behaviours were more common, $t(590) = -3.68$, $p < .001$ ($M_{\text{high K6}} = 4.86$; $M_{\text{low K6}} = 4.29$; $d = 0.41$), and acceptable, $t(588) = -4.90$, $p < .001$ ($M_{\text{high K6}} = 4.75$; $M_{\text{low K6}} = 3.90$; $d = 0.60$), in their friendship group. In addition, and unlike in Study 1, attendees with elevated psychological distress had higher trait impulsivity, $t(592) = -7.13$, $p < .001$ ($M_{\text{high K6}} = 2.72$; $M_{\text{low K6}} = 2.14$; $d = 0.83$).

When asked about the perceived riskiness of specific behaviours that can lead to injury or death (e.g., jumping between balconies; drinking until passing out), distressed respondents rated these behaviours as significantly less risky compared to the rest of the sample, $t(585) = 5.56$, $p < .001$ ($M_{\text{high K6}} = 5.10$; $M_{\text{low K6}} = 5.91$; $d = 0.67$).

Study 2 Discussion

Study 2 broadly confirmed the findings of Study 1, providing further evidence of generally good mental health among adolescents attending a mass gathering (H1). Study 2 provided much stronger evidence for H2. Specifically, participants who had been attending the mass gathering for three days had better mental health than those participants who had just arrived. Furthermore, this main effect was qualified by an interaction with mass gathering identification, such that the "dosage" benefits of attendance were only seen among people who felt strongly connected to other attendees.

Study 2 was also broadly consistent with Study 1 in the novel profile it identified for those attendees experiencing elevated psychological distress. Specifically, Study 2 confirmed that males, those who felt socially isolated and negative about other groups, and those who felt that risk taking was common and acceptable in their peer group, were more likely to be experiencing psychological distress. Study 2 expanded upon this by also exploring ethnicity (non-white attendees were at elevated at risk), perceived riskiness of specific dangerous behaviours (seen to be less risky by distressed attendees), and size of social network (unrelated to risk). Although size of network was found to be unrelated to risk, the network size estimates provided by the participants may not be an accurate reflection of actual network size (e.g., due to exaggerations or biases inherent in such self-report measures). The only differences found between the two samples were that in 2016 (but not 2015), elevated psychological distress was associated with impulsivity and a belief that volunteers were less safe. The 2016 sample did not replicate the 2015 finding that the distressed group perceived the police to be more fun. Despite these minor differences, the overall profile of at-risk attendees is remarkably similar across the two years.

The main limitation of Study 2 was its recruitment strategy. While the recruitment of a large independent sample at Wave 2 provided enough statistical power to test (and confirm) our hypotheses, these data are not longitudinal. Therefore, it is also possible that the differences between Wave 1 and Wave 2 in mental health were attributable to other, unmeasured, differences between the samples (although the equivalence of the samples in terms of demographic characteristics makes this less likely). It is important, therefore, that Study 1 found the same result with a truly longitudinal, albeit small, sample.

General Discussion

This project was the first investigation of mental health at a youth mass gathering and yielded three main findings. The first was that attendees were, on average, in better mental health than their age peers in the general community – a trend that was more pronounced for

respondents who had been at the mass gathering for several days than for those responding on Day 1. This effect was such that the proportion of attendees who met criteria for a probable serious mental illness was substantially lower than their age peers in the general population. Second, we found that attendee mental health was higher among those who strongly identified with other attendees at the mass gathering, and that this relationship between identification and mental health became stronger across the course of the mass gathering. Put another way, young people experienced mental health benefits when they subjectively experienced the mass gathering as an *enactment of an important social identity* – the celebration of the end of high school and the beginnings of the transition to adulthood. Third, we profiled attendees with probable serious mental illness (18+ on the K6) to better characterise who is at risk at a youth mass gathering, particularly in relation to experiencing a mental health crisis. This revealed a subsample of attendees, who were predominantly male, more likely be of a minority ethnic group, who felt socially isolated, and had more negative attitudes about other groups at the event. This high risk group were more impulsive, and saw risk taking behaviours as both more normative and less risky.

Theoretical and Practical Implications

Despite decades of media scrutiny portraying adolescent mass gatherings (and Schoolies in particular) as rife with risk taking, suicidality, and poor health, these findings suggest that mass gatherings are *not* a high-risk context for youth mental health. Indeed, in a sample of over 800 adolescents across two years, we found that attendees at a mass gathering known for its risk taking and disorderly behaviour were on average experiencing markedly less distress than their age peers. These findings may seem at odds with the general evidence that mass gatherings pose a wide range of (physical) health risks. A traditional account of mass gatherings would indeed predict the opposite effect, that attendance at mass gathering might lead to a decline in mental health, with an increasingly negative effect over time. Indeed, neither study can conclusively rule out selection effects, whereby those young people who were most distressed were less likely to attend the mass gathering, less likely to complete the questionnaires, or more likely to leave early.

Importantly though, our findings are consistent with a growing body of work that has found attendance at mass gatherings to have positive effects on wellbeing [19,56]. Indeed, the (small) evidence base on the psychology of mass gatherings suggests that a central reason why people take part in such events is that they represent collective celebrations of shared identity [16]. The current study provided evidence for this account of mass gatherings, for the first time using a clinically valid measure of psychological distress in an adolescent sample.

Of course, it is also worth noting that this theoretical perspective would not predict that all mass gatherings are necessarily beneficial for mental health. The main effect of "dosage" was qualified by the interaction with identification, and it is this interaction that we would expect to be the more generalizable finding. As an example, it seems likely that the amount of time spent in a crowd that occurs in the context of an emergency or disaster would be positively associated with psychology distress – however, social identification with others in the crowd might still be protective [23,26].

In addition to the finding that mental health is generally good among attendees and boosted by identification with the mass gathering itself, this project also characterised the profile of attendees who were experiencing poor mental health. While some of these patterns replicate more general risk factors for this age group (e.g., impulsivity, ethnic minority status), others are divergent. For instance, the elevated risk for males, found in both 2015 and 2016 attendees, contrasts with normative data for this age group, where females are typically at higher risk [52,43]. It is unclear why males might be at higher mental health risk in this context, although we speculate that the high levels of risk taking behaviour at this mass gathering could be relevant. These findings may be particularly useful for the development of interventions tailored toward the small subset of young people who are identified as being at risk.

These data also reveal that these at-risk attendees are experiencing both poor social relationships within their peer group (less identification, trust, and belonging) as well as more negative attitudes towards outside groups (police, volunteers). From an intervention perspective, this is a particularly concerning finding, as it is suggests that connecting these at-risk individuals with appropriate support services is likely to be substantially more difficult. Young people who believe police, volunteers, and their peers are hostile might be less likely to reach out to these groups for assistance, or to perceive efforts to provide such assistance in the (supportive) manner in which they are intended [57]. Interventions to support *belonging* may be indicated, both because these are likely to foster improved mental health [58,59], but also because increasing social connection may assist in linking such individuals with appropriate mental health support services.

Conclusions

Young people attend mass gatherings in order to celebrate a collective identity – in the case of Schoolies, their emerging identity of adulthood. This project has provided the first evidence, from over 800 adolescents attending Schoolies over two years, that attending a youth mass gathering is associated with benefits to mental health. Furthermore, we provide

evidence for the mechanism through which mass gatherings can benefit mental health: via a sense of subjective connection to other attendees coupled with the opportunity to *live out* one's valued social identities in the form of collective celebration. This speaks to why mass gatherings are so highly attended and characterises the subjective benefit that people derive from participation. Finally, we conducted an exploratory analysis to profile those attendees whose mental health was poor, and found consistent associations with being male, socially isolated, negativity towards other groups, as well as a higher propensity for risk taking. For stakeholders involved in managing youth mass gatherings, these findings provide guidance for targeting interventions as well as evidence that the sample requiring additional mental health support may be smaller than in other youth settings. In sum, it is clear that while mass gatherings pose a variety of unique challenges to health services, they can also be positive experiences for many attendees with accompanying benefits for mental health.

Table 1. Respondent Demographics.

	2015 (*N* = 217)			2016 (*N* = 595)		
Gender	51.2% female			49.6% female		
Geographic remoteness	75.1% Major cities 16.6% Inner regional 7.4% Outer regional 0% Remote or very remote			61.5% Major cities 23.4% Inner regional 7.1% Outer regional 0.4% Remote or very remote		
Ethnicity	*Not available*			83.6% European/White 4.7% Asian 4.0% Aboriginal or Torres Strait Islander 2.0% African 0.7% Pacific Islander 0.7% Middle Eastern 4.3% Other/Mixed		
	M	*SD*	Range	*M*	*SD*	Range
Age	17.21	0.52	16-19	17.20	0.61	16-22
Socioeconomic status (SEIFA)	6.56	2.45	1-10	6.33	2.54	1-10
Psychological distress (K6)	12.87	5.33	6-30	12.23	5.37	6-30
Identification with mass gathering	4.88	1.27	2-7	5.11	1.51	1-7
Identification with friendship group	6.17	1.16	2-7	6.07	1.30	1-7
Trust in friendship group	*Not available*			6.17	1.25	1-7
Belonging in friendship group	*Not available*			6.11	1.26	1-7
Size of network at Schoolies	*Not available*			85.17	92.93	0-300
Perceptions of other attendees:						
Fun	5.79	1.24	1-7	5.48	1.16	1-7
Safe	4.70	1.21	1-7	4.53	1.25	1-7
Hostile	3.40	1.39	1-7	3.11	1.20	1-7
Perceptions of police:						
Fun	4.27	1.57	1-7	4.18	1.51	1-7
Safe	5.48	1.44	1-7	5.82	1.39	1-7
Hostile	3.30	1.53	1-7	2.99	1.47	1-7
Perceptions of volunteers:						
Fun	5.28	1.46	1-7	5.42	1.48	1-7
Safe	5.73	1.29	2-7	5.81	1.35	1-7
Hostile	2.46	1.48	1-7	2.20	1.37	1-7
Friendship Norms:						
Risk taking is common	4.16	1.28	1-7	4.37	1.32	1-7
Risk taking is acceptable	3.71	1.48	1-4	4.02	1.46	1-7
Trait impulsivity	2.31	0.64	1-4	2.22	0.71	1-4
Perceived riskiness of behaviours likely to cause injury or death	*Not available*			5.81	1.23	1-7

Conflict of interest statement

The authors declare that they have no conflict of interest.

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